



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: WOLF ET AL - 1 PCT  
SERIAL NO.: 09/786,163 EXAMINER: J. M. BROWN  
FILED: FEBRUARY 28, 2001 GROUP: 1755  
TITLE: METHOD FOR PRODUCING ACTION AND/OR SELECTIVE  
SOLID CATALYSTS FROM INORGANIC OR ORGANOMETALLIC  
MATERIALS

SECOND SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

MAIL STOP AMENDMENT  
Hon. Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Supplemental to the Information Disclosure Statement filed on February 28, 2001, Applicant wishes to bring to the attention of the Patent Examiner the references listed on the enclosed Form PTO-1449 and attached thereto. These references were cited during the European Patent Nationalization or as being background prior art.

Applicant provides herewith a concise explanation of the relevance of *Sheridan, Kearsley, J. Chem. Inf. Comput. Sci.*, 1995, 35, 310-320; *McLeod, Johnston, Gladden, Journal of Catalysis* 167, 279-285 (1997); *Riekert, Chem.-Ing. Tech* 53 (1981) No. 12, 950-954; *Dongxing Li, Doctoral thesis, Karlsruhe, Germany*, 1990; *John H. Holland Adaptation in Natural and Artificial Systems*, MIT Press, 1975 and *David E. Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning*, Addison-Wesley, 1989.

1. Sheridan, Kearsley

*Sheridan* and *Kearsley* use a Genetic Algorithm to suggest combinatorial libraries. The method is drawn to the assembly of molecular fragments, not to the selection of components of solid catalysts. Specifically, amine and peptides are being used, not inorganic or metallorganic solid catalysts.

In detail, the fitness function (scoring) of *Sheridan, et al.* is calculated theoretically, not experimentally as in the present application. The concrete embodiment of the Genetic Algorithm differs as well from the present application. For instance, *Sheridan* and *Kearsley* do not disclose the use of variation of mole fractions. Only the best third of each generation is being selected for the next generation. One copy of this set is mutated, one is subject to exchange and one is kept. A probability for selection as disclosed in Claim 17 (d) of the present application is not used. The embodiment of a Genetic Algorithm as disclosed by *Sheridan* and *Kearsley* is much more complicated than the embodiment of the present invention and is drawn to a different system.

2. McLeod, Johnston, Gladden

*McLeod, et al.* describe the development of a Genetic Algorithm for molecular scale catalyst design. The distribution of adsorption sites on a two-dimensional catalyst surface is being optimised using a Genetic Algorithm approach. The method is not drawn to selecting components of three-dimensional catalysts. The work is purely theoretical based on a model system and not a real catalyst. The fitness function, the activity of the surfaces, is determined theoretically via a Monte Carlo simulation. The population size remains constant throughout the optimization process.

### 3. Riekert

*Riekert* is a paper discussing the possibilities and limits of deductive approaches to the development of industrial catalysts. It is not specifically drawn to Genetic Algorithms nor does it disclose a problem specific embodiment of a Genetic Algorithm.

### 4. Dongxing Li

The doctoral thesis of *Dongxing Li* is drawn to the partial oxidation of o-xylene to phthalic acid anhydride in a structured solid bed reactor. It is written in German comprising 108 pages. The thesis refers to the use of a Genetic Algorithm to structure solid catalysts in a reactor. In a first step a set of different catalysts is prepared. Having prepared the set of different catalysts, their linear order and each catalyst total mass in a linear solid bed of a reactor is optimized using a Genetic Algorithm approach. The components of the catalysts themselves are not subject to variation using a Genetic Algorithm approach. The fitness function is calculated mainly theoretically. Only at the end of the optimization process the solid bed reactor is realized and the yield is measured. The yield of phthalic acid anhydride is increased by about 2 %.

### 5. John. H. Holland and David E. Goldberg

The seminal books by *Holland* and *Goldberg* transfer the biological Genetic Algorithm to the field of non-living materials. Examples are, e.g., related to the field of machine learning or automatic control systems.

It is respectfully requested that the foregoing Second

Supplemental Information Disclosure Statement (IDS) be incorporated into the official file of the present patent application. Since this Second Supplemental Information Disclosure Statement is being filed after a first Office Action, the official fee of \$180.00 is enclosed. The Commissioner is hereby authorized to charge any additionally required fee or to credit any overpayment to our Deposit Account Number 03-2468.

Respectfully submitted,

COLLARD & ROE, P.C.



1077 Northern Boulevard  
Roslyn, New York 11576  
(516) 365-9802

Allison C. Collard, Reg. No. 22,532  
Edward R. Freedman, Reg. No. 26,048  
Frederick J. Dorchak, Reg. No. 29,298  
Attorneys for Applicant

ERF:lgh

Enclosures: Form PTO-1449 and six (6) references

Check in the amount of \$180.00

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on April 4, 2005.



Maria Guastella

FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. : WOLF, D ET AL-1 PCT		SERIAL NO. 09/786,163	
LIST OF REFERENCES CITED BY APPLICANT  (Use several sheets if necessary)				APPLICANT : DORIT WOLF ET AL			
				FILING DATE: FEB. 28, 2001		GROUP: 1755	
<b>U.S. PATENT DOCUMENTS</b>							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
<b>FOREIGN PATENT DOCUMENTS</b>							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION
							YES NO
	AL						
	AM						
	AN						
	AO						
	AP						
<b>OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, Etc.)</b>							
	AR		Sheridan, Kearsley, J. Chem. Inf. Comput. Sci., 1995, 35, 310-320.				
			McLeod, Johnston, Gladden, Journal of Catalysis 167, 279-285 (1997).				
	AS		Riekert, Chem.-Ing. Tech. 53 (1981) No. 12, 950-954.				
			Dongxing Li, Doctoral Thesis, Karlsruhe, Germany, 1990.				
	AT		John H. Holland, Adaptation in Natural and Artificial Systems, MIT Press, 1975.				
			David E. Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Addison-Wesley, 1989.				
EXAMINER				DATE CONSIDERED			
<small>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>							